

REMARKS

As required by 37 C.F.R. § 1.173(c), the status of the claims is as follows:

Claims	1-15	pending original claims
Claims	16-38	canceled new claims
Claim	39-43	pending new claims, previously added

Further, pursuant to the “special” provision of MPEP 708.01 for reissue proceedings, the Applicants request the Examiner take up for action this reissue proceeding in advance of other applications/proceedings, except those involved in litigation and prepare an office action in order that prompt issuance of a *Notice of Allowability* can be facilitated.

The Examiner’s non-final Office Action of December 3, 2003 has been received and its contents reviewed. Accordingly, the Applicants respectfully request reconsideration of the above-identified application, in view of the above amendments canceling claims 16-38 and for the reasons to follow. The Examiner’s indication that claims 1-15 are allowed is greatly appreciated.

With regard to the Examiner’s formality objection, under 37 C.F.R. § 1.63(c)(2), § 1.76 and § 1.175, of the original Declaration (PTO/SB/51) as not providing the priority information, please find attached an Application Data Sheet (ADS) properly setting forth the foreign priority information. Additionally, even though the foreign applications JP 10-254996, filed September 9, 1998, and JP 10-326352, filed November 17, 1998 have been set forth on the Official Filing Receipt, the Applicants hereby claim benefit, under 35 U.S.C. § 119, to:

JP 10-254996, filed September 9, 1998,

JP 10-326352, filed November 17, 1998

Accordingly, the requirements of 37 C.F.R. § 1.55, § 1.63(c)(2), § 1.76 and § 1.175 are deemed to have been satisfied, and, therefore, withdrawal of the objection to the original Declaration (PTO/SB/51), submitted November 13, 2001, is now in order.

Referring now regard to the Examiner’s rejections of:

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Claims 16-27, 31-38, under § 103(a), as being obvious in view of the combination of teachings of the Applicants Admitted Prior Art (AAPA), Shih ('320) and Akasaki et al (JP '679),

Claims 28-30, under § 103(a), as being obvious in view of the combination of teachings of the Applicants Admitted Prior Art (AAPA), Shih ('320), Akasaki et al (JP '679) and Nagao JP '471),

Claims 39-40, under § 103(a), as being obvious in view of the combination of teachings of the Applicants Admitted Prior Art (AAPA), and Akasaki et al (JP '679), and

Claims 41-43, under § 103(a), as being obvious in view of the combination of teachings of the Applicants Admitted Prior Art (AAPA), Akasaki et al (JP '679) and Nagao JP '471),

each of these rejections is traversed. Specifically, with the cancellation of claims 16-38, the rejections, under § 103(a), based upon the combination of teachings of Applicants Admitted Prior Art (AAPA), Shih ('320), Akasaki et al (JP '679) and Nagao JP '471) have been rendered moot.

Additionally, with regard to the rejections of claims 39-43, under § 103(a), the Applicants would point out that the teachings of AAPA and the Akasaki et al. reference are not combinable and further, even if combined, would not yield the invention as presently claimed. Specifically, claim 39 sets forth a method of fabricating an semiconductor device including the following steps:

- a) forming a semiconductor layer of a Group III nitride containing a dopant over a substrate;
- b) forming a p-side electrode out of a metal on the semiconductor layer; and
- c) after introducing the substrate into a vacuum chamber, charging plasma into the vacuum chamber to form an ambient of plasma while keeping the temperature of the substrate at about 600°C or lower, thereby making the conductivity type of the semiconductor layer p-type. (Emphasis added)

A review of the AAPA, see Figure 10, column 1, lines 28-42 and column 2, lines 17-20, reveals an assertion of a known method of treatment of a p-doped Group III nitride semiconductor layer employing the plasma exposure process, allegedly disclosed in JP Laid-Open Patent Publication 10-144960 ('960). Additionally,

Akasaki et al. has been cited by the Examiner to allegedly establish that the AAPA plasma treatment could be conducted at temperatures $\leq 600^{\circ}\text{C}$ as presently claimed. However, a review of Akasaki et al. reveals an electron beam treatment process, carried out at $\leq 600^{\circ}\text{C}$, for activating a p-type dopant, i.e., Mg, in a $\text{Ga}_{1-x}\text{Al}_x\text{N}$ layer of the semiconductor device.

Initially, the Applicants assert that the alleged plasma process of the AAPA (JP'960) and e-beam process of Akasaki et al. have not been shown or asserted by the Examiner to be equivalent processes for the use in activating the p-type dopant in a Group III nitride layer of a semiconductor device. In fact, these processes (and apparatus) are quite different.

For example, an e-beam process employs a spot or flat beam of electrons, such as in Akasaki et al, which is generated by a DC power source at significantly high voltages, i.e., 6-30 kV, to create the electron beam in a vacuum/low pressure environment. The electrons in the e-beam are directed (scanned) onto the substrate thereby transferring the energy of the electrons to the atoms of the substrate. In contrast, a plasma treatment technique generates a radio frequency field in the space between a set of electrodes and fills that space with a gas which is ionized to create the plasma gas (note the substrate to be treated is immersed in plasma). This technique operates at much lower voltage and power requirements, i.e., 150 kW, than an e-beam process and achieves the desired transfer of energy (reaction) with the substrate via a different charged particle. Therefore, there is no reason or suggestion, provided by Akasaki et al. or the Examiner, for one of ordinary skill in the prior art to assume (given the teachings relied upon by the Examiner), that substitution of one process parameter (temperature) from one process for activation of the p-type dopant would have been obvious for use in another dissimilar process for activation of the p-type dopant.

Additionally, a review of the JP '960 document (machine translation provided), which is asserted by the instant specification, at column 2, lines 17-20, to teach plasma annealing to reduce the hydrogen content of the Group III nitride

semiconductor layer, reveals that the JP '960 only teaches annealing at 600°C or e-beam illumination processing to reduce the hydrogen content of the Group III nitride semiconductor layer (see paragraphs [0007] and [0029]). That is, a plasma annealing treatment is not taught or suggested by JP '960. Therefore, the even if the teachings of the AAPA and Akasaki et al. are combined as suggested by the Examiner, the combination of teachings would not set forth the "plasma" treatment specified by the claims 39-43. For these reasons, the combination of teachings of AAPA and Akasaki et al. does not establish a *prima facie* case of obviousness, and the rejection of claims 39 and 40, under § 103(a), must be withdrawn.

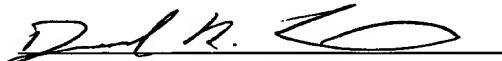
With regard to the Examiner's citation of the Nagao (JP '471) reference in the rejection of claims 41-43, under § 103(a), a review of that reference reveals that, while teaching the use of an Al contact electrode in LED semiconductor device, the reference contains no teaching of plasma treating a p-type Group III nitride semiconductor layers to remove hydrogen and activate the p-type dopant, nor does Nagao contain any teaching of the equivalence between a plasma treatment method (for p-type Group III nitride semiconductor layers to remove hydrogen and activate the p-type dopant) and an e-beam treatment for the same layers. Without such teachings, the combination of teachings of AAPA, Akasaki et al. and Nagao also does not set forth a *prima facie* case of obviousness for claims 41-43, and therefore, the rejection of those claims, under § 103(a), has also been set forth in error and must be withdrawn.

Please note that the citation of the English translation of JP Laid-Open Patent Publication 10-144960 is provided in accordance with the guidelines of MPEP Chapter 609-C(3), and accordingly compliance with the requirements of 37 C.F.R. 1.97 and 1.98 is not required in order for the Examiner to consider the teachings of the above patent document. However, for the Examiner's convenience in indicating consideration of the above patent a PTO-1449 has been included. It is respectfully requested that an initialed copy of the PTO-1449 be included with the next Office Action.

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While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with Applicants' representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,



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